Radiologic Case

A Case of Free Air in the Peritoneum

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Series' Editor

The patient, a 42-year-old man, presented to the hospital with a fall and leg weakness due to human immunodeficiency virus-related radiculopathy. During the course of the hospital stay, the adult respiratory distress syndrome developed. An endotracheal tube was inserted; the patient removed the tube and had to be intubated a second time. After the second intubation, subcutaneous emphysema developed on his neck, face, arms, and anterior chest wall. There was no pneumothorax on a chest film. Two days later, another roentgenogram was taken.

What does the chest film show?

What are the different diagnostic possibilities?

How can the diagnosis be proved?

SEE FOLLOWING PAGE FOR DIAGNOSIS AND DISCUSSION

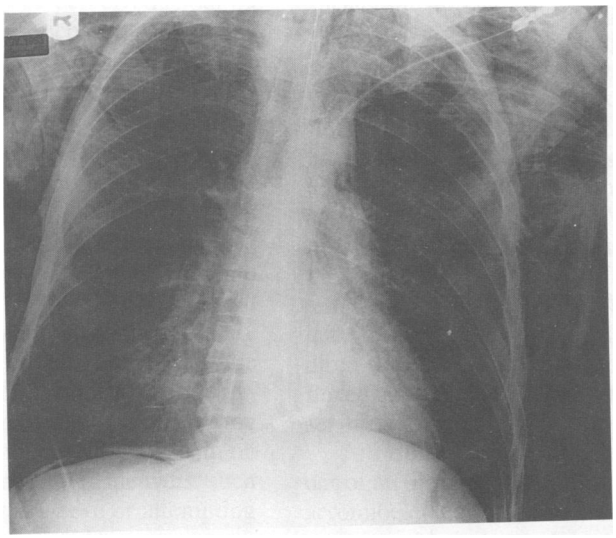

Figure 1.—An anteroposterior x-ray film of the chest was taken 2 days after the patient had a normal roentgenogram.

(Lee R, Zaman M, Bondi E, Saxena M, Zupnick H: A case of free air in the peritoneum. West J Med 1995; 163:387-388)

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ANSWER: Pneumoperitoneum due to barotrauma

THE ROENTGENOGRAM SHOWS free air under the right side of the diaphragm in addition to subcutaneous emphysema throughout the soft tissues. Usually the presence of free air under the diaphragm suggests a surgical emergency because it may represent an acute perforation of an abdominal viscus. Free air may also be found after laparotomy or laparoscopy. Perforation can be demonstrated by giving the patient an oral contrast medium and observing for any extravasation. This patient had a gastrografin study done that revealed no extravasation of the contrast agent into the peritoneum.[1]

The free air in this case was likely caused by barotrauma. Alveoli can rupture, and air can dissect along the peribronchial space or perivascular space. This air can then go to the mediastinum, subcutaneously, or beneath the visceral pleura, causing a pneumothorax.[2] If the air goes to the mediastinum, and the patient has an absent peritoneal pleura and a defect in the diaphragm such as a posterolateral (Bochdalek's) hernia, parasternal (Morgagni's) hernia, or the central opening of the diaphragm, then air can track downwards into the peritoneal cavity.[3]

REFERENCES

1. Turner WW, Fry WJ: Pneumoperitoneum complicating mechanical ventilator therapy. Arch Surg 1977; 112:723-726

2. Kirby TJ, Ginsberg R: Management of pneumothorax and barotrauma—Thoracic surgical considerations for the pulmonologist. Clin Chest Med 1992; 13:97-112

3. Lantsberg L, Rosenzweig V: Pneumomediastinum causing pneumoperitoneum. Chest 1992; 101:1176